

Using Luseweilei insecticide to control *Dendrolimus superans* T.

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Abstract: Luseweilei is an easily-burst microcapsule insecticide. A test of effectiveness of the insecticide to control the larvae of *Dendrolimus superans* T. was carried out in larch forest in Baoan Forest Farm of Nehe City, Heilongjiang Province, in April 2001. The solutions of different concentrations (1:150, 1:250, 1:350, and 1:450 Luseweilei : water) were sprayed on the larch trunk before the overwintering larvae climbing on trees and the spraying lengths (height) designed were 1.0, 2.5, and 3.5 m high from ground. The control result showed that spraying 150-, 250-, and 350-fold solutions of the insecticide all produced a good control result, with a mortality rate of 97%, but the 450-fold solution only produced 70% mortality. It is concluded that this insecticide can be used as a kind of good insecticide to control the overwintering larvae of *D. superans* in spring. Spraying 350-fold solution of easy-burst microcapsule insecticide and one meter spraying length are recommended for the future application..

Key words: *Dendrolimus superans* T.; Easy-burst microcapsule insecticide; Control test

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Introduction

Dendrolimus superans T. is one of the main insect pests of *Larix* spp. (Hou 1995). This pest frequently breaks out in the northeast of China and results in serious economic loss (Zhang 2001). Ground spraying or aerial spraying of chemical insecticides was often carried out to control the pest in large area in the past. Spraying chemical insecticides results in environment pollution due to the drifting of large quantity of insecticides (Miao .1990).

Luseweilei, an easy-burst microcapsule insecticide, is a new kind of insecticide agents, which takes a natural macromolecular compound as capsule materials. The microcapsule is sized from several to dozen microns in diameter. The capsule has thin, fragile, even skin, and good sealing, with good resistance to environmental resolving, and can prolong the effective period of insecticide. This easy-burst microcapsule insecticide had been used to control longicorns. In our experiment, this insecticide was tested to control *D. superans* by tree-trunk spraying.

Experimental area

The experimental plots were set up in artificial larch forest (*Larix* spp), located at the Baoan Forest Farm of Nehe City, Heilongjiang Province. In total, 12 experimental plots including two contract plots were chosen at random, with an area of 333 m² for each plot and a 20 m interval between.

The plots were classified into two categories according to the age of forest and landforms. For plots numbered 1 to 7, locating at flat land, the forest age was 25, tree height 10-11 m, thickness of litter 2-3 cm, and canopy density was 0.6-0.8, and for the plots numbered 8-12, locating at slope land, the forest age was 20, tree height 1-11 m, litter thickness 4-5 cm, and canopy density was 0.6-0.8.

Materials and methods

Materials

The 8% easy-burst microcapsule insecticide (Luseweilei), which took cypermethrin as the main component and was made by Hongtaiyang Group Company in Nanjing City, was used to control 2-4 instar larvae of *D. superans*. 3WF-3S sprayer, made by the Sprayer Machinery Factory of Linyi City of Shandong Province, was employed for spraying.

Methods

The compounding insecticide was diluted to 1:150-, 1:250-, 1:350-, and 1:450 solutions (Luseweilei : water). These solutions with different concentrations were sprayed on trunks of Larch and the spraying length (height) on trunk was 1 m, 2.5 m and 3.5 m from ground. Water spraying was also carried out as control.

Fifty sample trees were selected randomly for investigation of the density of *D. superans* in each plot before control. All the trees in the plots were infested by *D. superans*. In our investigation, the number of overwintering larvae in litter within the projection of tree crown was determined as the actual population density of *D. superans*. Generally, the overwintering larvae of *D. superans* begin to climb on tree

when the average air temperature reaches 10 °C. To ensure an accurate statistic, before spraying, the trunk base of sample tree was bound up with plastic cloth to stop the larvae climbing on trees. The plastic cloth was taken off on the control day (April 25, 2001). After spraying, an investigation was carried out every 12 hours. Both dead larvae and living larvae were recorded after control.

Results and discussion

Experimental result showed that the easy-burst microcapsule insecticide (Lvseweilei) had a strong contact-killed effect on *D. superans* larvae. The control results were shown in Table 1. The larvae dropped on ground when they crawled across a 1-m-height spraying layer on the trunk. After contacting the insecticide, the younger larvae were killed in two hours, but a little longer time was

needed for killing the older ones. All the larvae being hit by the insecticide died in 24 h. The body segments of dead larvae shrank and the anuses of part of dead larvae prolapsed.

A good control result was obtained when spraying the 150-350-fold solution of easy-burst microcapsule insecticide on trunk for more than 1-m high. More than 97% of *D. superans* larvae were killed. It is concluded that this insecticide can be used as a kind of good insecticide to control the overwintering larvae of *D. superans*.

From viewpoints of economics and ecological environment protection, spraying 350-fold solution of easy-burst microcapsule insecticide on larch trunk for one meter high can efficiently control the *D. superans*. This concentration and spraying length (height) can be regarded as a standard for the control of *D. superans* in the future.

Table 1. The control result of *D. superans* larvae by spraying the easy-burst microcapsule insecticide on trunk of tree.

Plot No.	Diluting-fold of insecticide	Spraying height	Population density before control (larvae/ Tree)	Population density after control (Larvae /tree)	Mortality (%)	Modified mortality (%)
1	150	3.5	149.5	0	100	97.40
2	150	2.5	104.0	0	100	97.40
3	150	1.0	164.0	0	100	97.40
4	250	3.5	127.3	0	100	97.40
5	250	2.5	169.8	0	100	97.40
6	250	1.0	112.5	0	100	97.40
7(control 1)	water		138.3	134.7	2.6	
8	350	1.0	341.5	10.0	97.07	97.02
9	350	1.0	252.0	5.5	97.82	97.78
10	450	1.0	274.6	77.0	71.96	71.46
11	450	1.0	311.0	101.0	67.52	66.94
12(control 2)	water		303.8	298.5	1.75	

References

- Hou Kunlong. 1995. The outbreak and control tactics of forest rodent pest in Heilongjiang Province [J]. *Forest Pest and Diseases*, (4): 43-45.
- Miao Jiancai, Xie Kaili, Wang Lichun *et al.* 1990. The chemical control of forest [M]. Harbin: Northeast Forestry University Press, 259-275
- Shu Fengmei, Shang Haipeng, Hao Deren. 1991. A study on the preventing rodent pest using residue of tending in young forest [J]. *Scientia Sinica*, 27(1): 79-83.
- Wang Lichun, Wang Zhiying, Yue Shukui *et al.* 1993. The research methods of forest diseases and pests [M]. Harbin: Northeast Forestry University Press, 1-13.
- Zhang Guocai, Hu Chunxiang, Yue Shukui *et al.* 2001. Control of *Lymantria dispar* L. in large area of forest [J] *Journal of Northeast Forestry University*, 29(1): 129-132